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EXAMINER
NGUYEN, KHIEM D

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 12/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/033,233	AKRAM, SALMAN
	Examiner	Art Unit
	Khiem D Nguyen	2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 28 December 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1☒ Notice of References Cited (PTO-892)

2☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s).

3☐ Interview Summary (PTO-413) Paper No(s).

4☐ Notice of Informal Patent Application (PTO-152)

5☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-
(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

1. Claims 1-4 and 6-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Mertol (U.S. Patent 6,011,304).

Mertol teaches a method of making an IC chip package having an IC chip 1 with an active surface, the active surface having extending thereform an electrical connector 4 in electrical communication with IC chip, the IC chip being mounted upon a substrate 2, the method comprising (See col. 6, lines 14-63 and FIGS. 7A-B):

providing a container 11 disposed upon the substrate encloses a volume external to the IC chip elements and securing the container to the substrate with a dam structure that contacts the grease;

injecting a grease in contact with the active surface of the IC chip such that the grease is:

is in contact with the active surface and the electrical connector

operating the IC chip to generate heat thereform; and

conducting the heat from the IC chip and the electrical connector to the grease, to the container, and to the ambient.

Mertol discloses in (col. 3, line 64) wherein a flip chip is disposed over the active surface of the IC chip and wherein the container is a dam structure (See col. 6, lines 42-64) that in contact with each of the IC chip, the flip chip, and the grease.

Mertol discloses in (col. 7, lines 4-5) wherein the container comprises a metal that has a thermal conductivity greater than the thermal conductivity of the grease.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol (U.S. Patent 6,011,304) as applied to claims 1-4 and 6-11 above, and further in view of Hunadi et al (pp. 28-32, Advanced Packaging, April 1999).

Mertol discloses most aspects of the instant invention but fails to teaches wherein grease having a thermal conductivity in a range from about 2 Watts/m · K to about 5 Watts/m · K, a dielectric constant in a range from less than about 6 to about 9, and a melting point in a range from about 190° C to about 220 °C as recited in present claim 5

[illegible] Watts/m · K, a dielectric constant of 7.02 and a melting point at 200 C. It would have been obvious to one of ordinary skill in the art at the time of the invention [illegible]

substitute the grease of Mertol by Hunadi grease because it have superior performance over the conventional thermal greases as taught by Hunadi (See pp. 32).

3. Claims 12-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Mertol (U.S. Patent 6,011,304).

Mertol teaches a method of making an IC chip package having a flip chip 1 with an inactive surface and an active surface, the active surface having extending thereform an electrical connector 4 in electrical communication with flip chip, the flip chip being mounted upon a substrate 2, the method comprising (See col. 6, lines 14-63 and FIGS. 7A-B):

providing a container 11 disposed upon the substrate and in contact with the inactive surface of the flip chip (col. 3, lines 61-67);

injecting a grease between the contact and the substrate so as to contact with the active surface of the flip chip (See col. 8, lines 61-64), wherein:

the container with the substrate encloses the grease, the electrical connector, and the flip chip (See FIGS. 7A-B);

the grease is in contact with the active surface and the electrical connector.

operating the flip chip to generate heat thereform; and

conducting the heat from the flip chip and the electrical connector to the grease, to the container, and to the ambient.

4 Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol (U.S. Patent 6,011,304) as applied to claims 12-14 above, and further in view of Hunadi et al (pp. 28-32, Advanced Packaging, April 1999).

Mertol discloses most aspects of the instant invention but fails to teaches wherein grease having a thermal conductivity in a range from about 2 Watts/m · K to about 5 Watts/m · K, a dielectric constant in a range from less than about 6 to about 9, and a melting point in a range from about 190° C to about 220 °C as recited in present claim 15.

Hunadi discloses in (tables 1-3), a thermal grease A having a thermal conductivity of 3.3 Watts/ m · K, a dielectric constant of 7.62 and a melting point at 200°C. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the grease of Mertol by Hunadi grease because it have superior performance over the conventional thermal greases as taught by Hunadi (See pp. 32).

5. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mertol (U.S. Patent 6,011,304) in view of Yew et al. (U.S. Patent 6,218,202) and Hunadi et al (pp. 28-32, Advanced Packaging, April 1999).

Mertol teaches a method of making an IC chip package having a first IC chip 1 with an active surface, the active surface having extending thereform an electrical connector 4 in electrical communication with the first IC chip, the first IC chip being

providing a container 11 disposed upon the substrate, and

injecting a grease between the substrate and the container (See col. 8, lines 61-64);

wherein the grease:

is in contact with the electrical connector and with the active surface of the IC chip; and

is enclosed within the container and the substrate.

operating the IC chip to generate heat thereform; and

conducting the heat from the IC chip and the electrical connector to the grease, to the container, and to the ambient.

Mertol fails to teach wherein the first IC chip being mounted upon a first side of a board-on-chip (BOC) substrate, a second IC chip having an active surface and being disposed over the first side of the BOC substrate as recited in present claim 16.

Yew discloses a chip package in (FIG. 7 and related text) wherein a chip mounted on the first side of the BOC substrate and a second chip having an active surface disposed over the first side of the BOC substrate. It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate Yew's teaching into Mertol's method in order to increase the capacity of the device without a substantial size increase

Mertol discloses most aspects of the instant invention but fails to teaches wherein

melting point in a range from about 190° C to about 220 °C as recited in present claim 19.

Hunadi discloses in (tables 1-3), a thermal grease A having a thermal conductivity of 3.3 Watts/ m · K, a dielectric constant of 7.62 and a melting point at 200°C. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the grease of Mertol by Hunadi grease because it have superior performance over the conventional thermal greases as taught by Hunadi (See pp. 32).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri Olik can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.